Bonfiglioli
Vectron

Agile

Operating instructions
Frequency inverter 230V / 400V
0.25 kW ... 11 kW

Bonfiglioli
power, control and green solutions

Safety

⚠ Warning!

- The safety instructions and information on use in this documentation must be complied with strictly.
- Read this documentation before installing and commissioning the frequency inverter.
- Non-compliance with the precaution described may result in death, serious injury or material damage.
- Only qualified personnel trained in installation, commissioning and operation of frequency inverters may carry out work on the frequency inverter and system.
- The electrical installation must be carried out by qualified electricians according to the general and regional safety and installation directives
- Persons who are not familiar with the operation of the frequency inverter and children must not have access to the device.
- Commissioning and start of operation is not allowed until it has been verified that the machine meets the requirements of the EC Machinery Directive 2006/42/EC and EN 60204.
- Comply with the standards for work on equipment of heavy current installations such as EN 50178 and also with national accident prevention regulations and directives for electrical and mechanical equipment erection.
- Before commissioning and the start of the operation fix all covers, assemble all components of the standard equipment and check the terminals.
- No connection work may be performed, while the power supply is switched on.
- High voltage may apply at terminals, even if the motor comes to a standstill.
- Do not touch terminals before capacitors have discharged.
- Do not touch the heat sink during operation as there is a risk of skin burn due to high temperature.
- Do not remove covers during operation.
- Please note, that Bonfiglioli Vectron does not take any responsibility for the compatibility of external products (e.g. motors, cables, filters, etc.).
  Using the device in combination with external products is carried out at your own risk.
- Do not touch electronic components or contacts.
- Do not operate damaged or destroyed components.
- Repairs may only be carried out by the manufacturer or persons who are authorized by the manufacturer.
- Repairs must be carried out by qualified electrotechnical experts.
- Do not modify the frequency inverter in any way not explained in this documentation.
- The frequency inverter may be connected to power supply every 60 s. This must be considered when operating a mains contactor in jog operation mode.
- After a failure and restoration of the power supply, the motor may start unexpectedly. If personnel is endangered, a restart of the motor must be prevented by means of external circuitry.
- Do not connect an inappropriate voltage supply.
- Keep the manual accessible to the operators.

Proper use

The product is an electrical drive component. It is applicable for
- installation in machines or electrical plants
- the control of three-phase asynchronous motors and synchronous motors
- industrial environments

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Transport and Storage

Ambient temperature: -25 ... 55 °C
Relative humidity: 5 ... 95%, free of condensation

- Store in original packaging in dry rooms without dust.
- Avoid high temperature variations.
- Connect to mains voltage for 60 minutes after one year of storage before use.

On opening the package

- Make sure that the delivered product is the part you have ordered.
- Check if the product is damaged and make sure that the delivery is complete.
- Notify complaints to the supplier immediately.

Installation

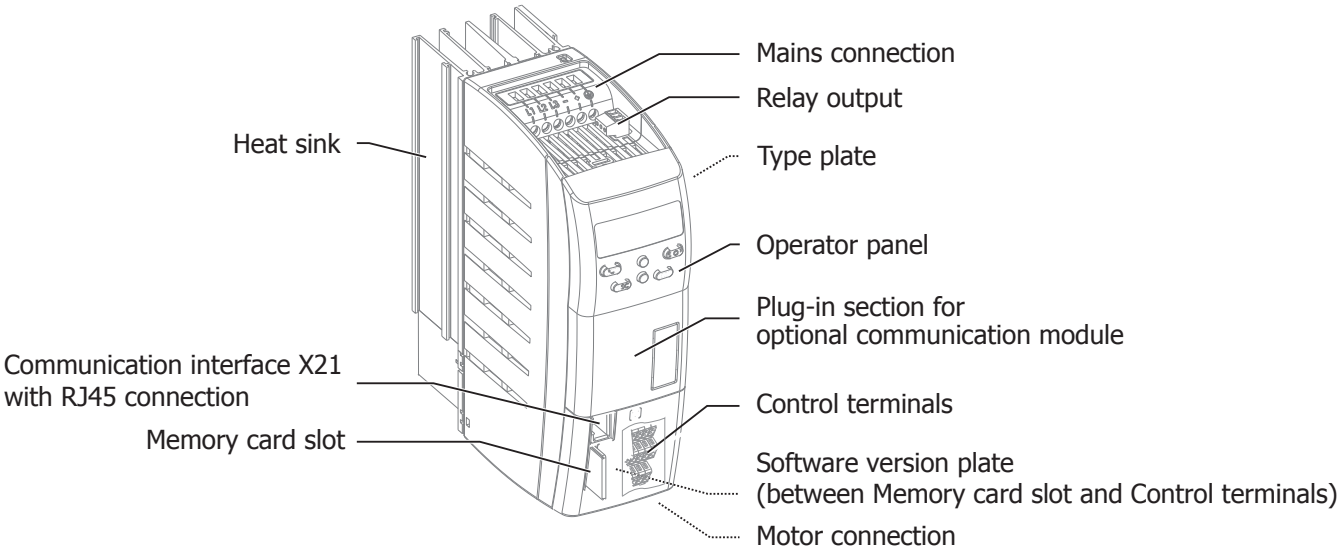
- Indoors , protected against weather influence.
- Avoid direct sunlight exposure.
- Avoid dust.
- Keep away from strong electromagnetic fields.
- Keep away from combustible material.
- Provide sufficient cooling. Install fans when installing the frequency inverter inside an enclosed cabinet.
- Altitude: ≤3000 m, over 1000 m with derating (output current reduction).

The degree of protection of the frequency inverter is IP20.

Operating conditions

Ambient temperature: 0 ... 40 °C
Relative humidity: maximum 85%, free of condensation
Ambient pressure: 70 ... 106 kPa

Overview



Inverter type

- Determine the type of frequency inverter.
- Verify that the rated input voltage corresponds to the local power supply.
- Verify that the recommended motor shaft power of the frequency inverter corresponds to the rated power of the motor.

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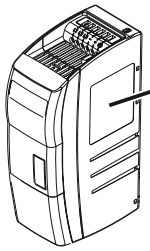
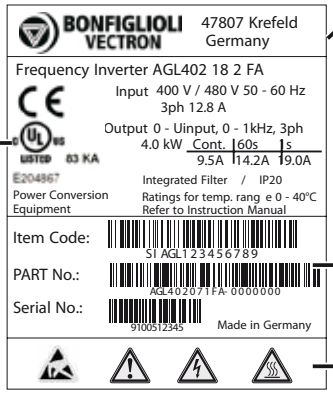




Type designation

AGL 402-05

Rated input voltage		Recommended motor shaft power		Frame size
402	400 V	02	0.25 kW	1
		03	0.37 kW	1
		05	0.55 kW	1
		07	0.75 kW	1
		09	1.1 kW	1
		11	1.5 kW	1
		13	2.2 kW	1
		15	3.0 kW	2
		18	4.0 kW	2
		19	5.5 kW	3
		21	7.5 kW	3
		22	9.2 kW	3
		23	11.0 kW	3

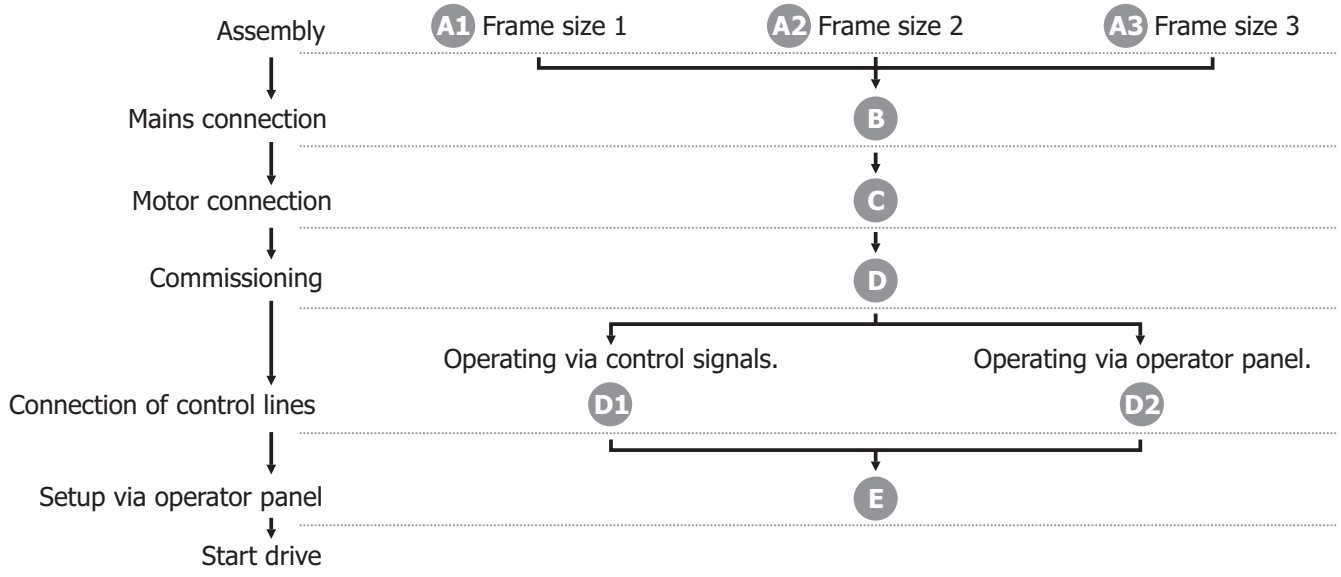
Part number & Serial number

Warning! Electrostatic sensitive components.

Warning! High leakage current.

Warning! Dangerous voltage. Risk of electric shock.

Warning! Hot surfaces.



A1 ... E : Refer to the corresponding section.

A Assembly

Warning!

- Make sure, that no foreign particles (e.g. dust, metal shavings, wires, screws, tools) can get inside the frequency inverter.
- Install the frequency inverter on a nonflammable mounting plate.
- Installation in bottom-up or horizontal position is not permissible.

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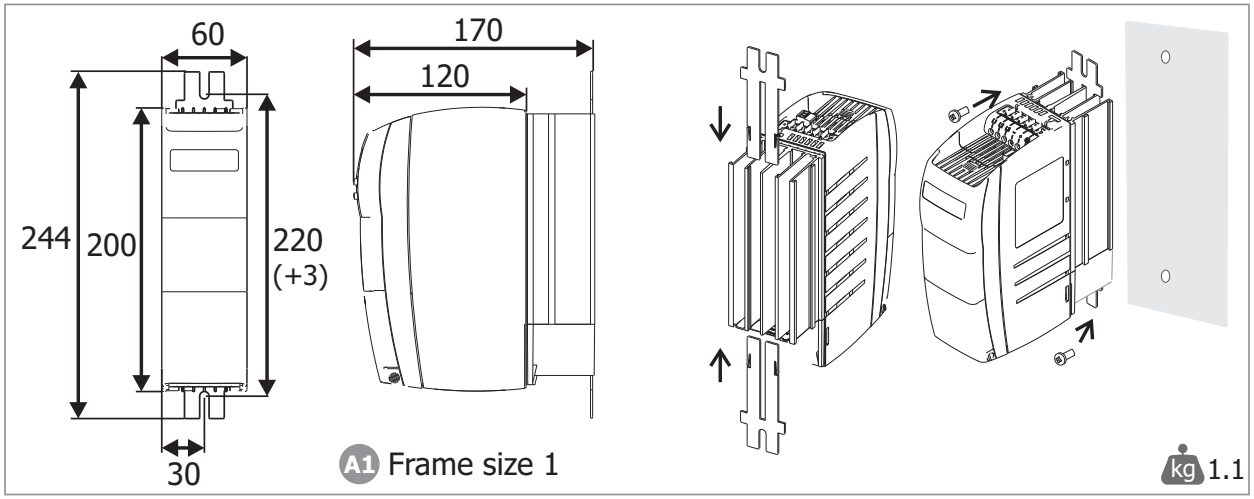
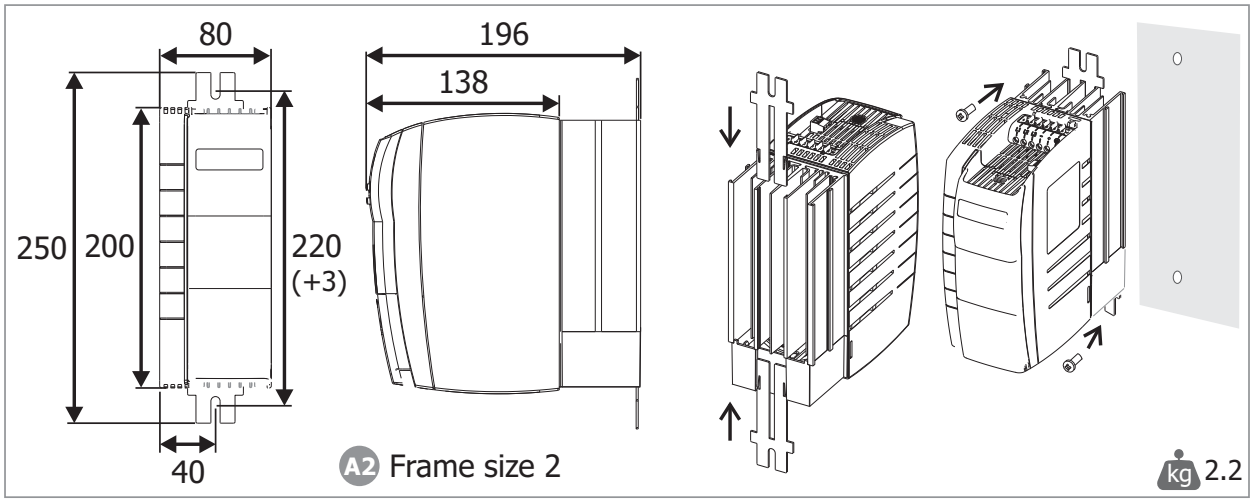
- Screw the frequency inverter to a metallic (not varnished) mounting plate.
- The frequency inverter must be earthed.
- For potential equalization connect frequency inverters, cabinets, machine frames, filters etc. via short conductors (with large cross-section) to the same earth potential.



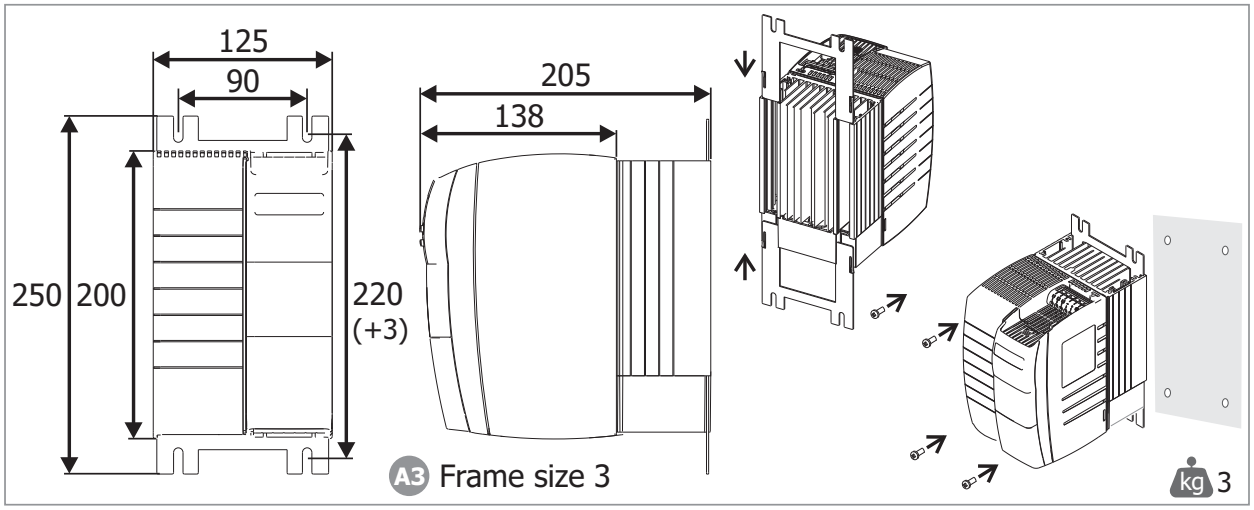
A1 Frame size 1

kg 1.1



A2 Frame size 2

kg 2.2

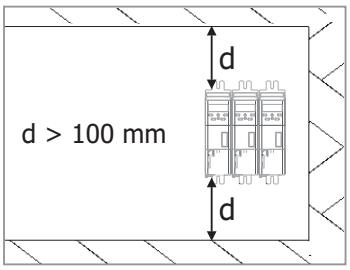


A3 Frame size 3

kg 3

A Assembly

Installation spacing



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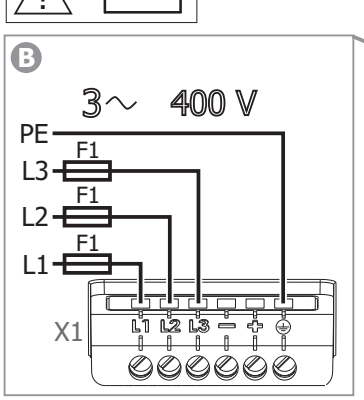
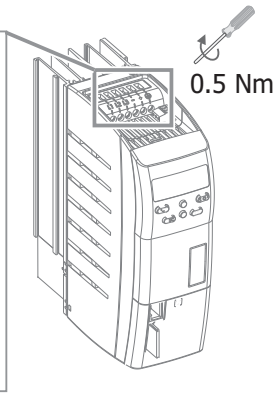
B Mains connection

Danger!

- Switch off power supply.
- Dangerous voltage: The power terminals may carry dangerous voltages for some time even if the power supply is switched off. Wait for some minutes before starting to work at the frequency inverter.
- Make sure that the frequency inverter is de-energized.

- Do not carry out high voltage insulation tests on cables connected to the frequency inverter.
- Follow local wiring codes.
- Connect mains supply.



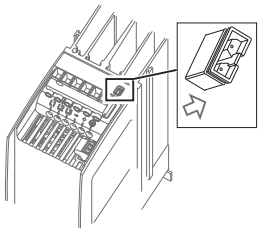


	kW	0.25 ... 1.5	2.2	3.0	4.0	5.5	7.5	9.2	11
F1	A	6	10	10	10	25	25	35	35
Ø L1, N	mm²	1.5				2.5		4	
Ø PE	mm²	2 x 1.5				2 x 2.5		2 x 4	
or		1 x 10				1 x 10		1 x 10	

Ø mm²	AWG
1.5	16
2.5	14
4	12
10	8

Note:
– ⏚: Only required for DC-link connections.

Connection on IT mains configuration



For connection on IT mains configuration remove the IT-jumper.

Note:
The removal of the IT-jumper reduces the noise immunity. The noise immunity can be improved by external filters.

C Motor connection

Danger!

- Switch off power supply.
- Dangerous voltage: The power terminals may carry dangerous voltages for some time even if the power supply is switched off. Wait for several minutes before starting to work on the frequency inverter.
- Make sure that the frequency inverter is de-energized.

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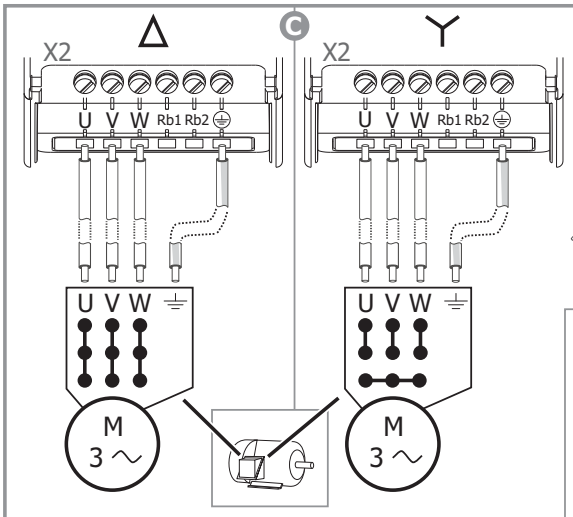
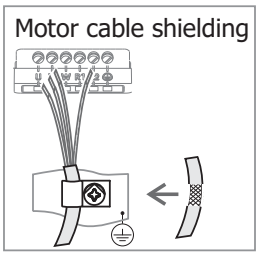
- Ground the motor-side grounding terminal.
- Connect the motor.
- Cables must be as short as possible.
- Comply with the data of the motor type plate for star or delta connection.
- Connect the conductor shielding of the motor cable to ground potential by means of the shielding clamp.
- Connect the conductor shielding to ground potential on both sides (near to the frequency inverter and near to the motor).





Conductor cross-section

	kW	0.25 ... 4.0	5.5	7.5	9.2	11
Ø U, V, W	mm²	1.5	2.5		4	
Ø PE	mm²	2 x 1.5	2 x 2.5		2 x 4	
or		1 x 10	1 x 10		1 x 10	

Ø mm²	AWG
1.5	16
2.5	14
4	12
10	8

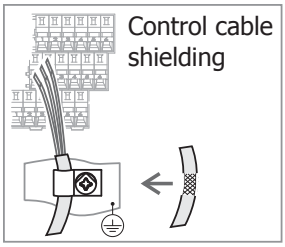
Max. motor cable length [m]

Recommended motor shaft power	kW	≤ 1.5	2.2 ... 11
unshielded cable		50	100
shielded cable		25	50

Rb1, Rb2: Only required for braking resistor connection.

Wiring of control cables

- Use shielded control cables.
- Connect the conductor shielding of the control cables to ground potential by means of the shielding clamp.
- Connect the conductor shielding to ground potential on both sides of the cable. Analog cables must be grounded only on the inverter side.
- The control cables must be separated from the motor cable and mains cable (not in the same cable duct).



D Commissioning

▪Before putting the frequency inverter into operation all covers of the device must be assembled.

⚠ Warning!

▪Switch off power supply before connecting or disconnecting terminals.

A Assembly

B C Electrical connection of mains and motor

Operating via control signals

D1 Connect
- switch for enable signal
- switches for drive-starting and reversal of rotation
- potentiometer for speed control

E Setup via control signal. Refer to section "Setup via operator panel".

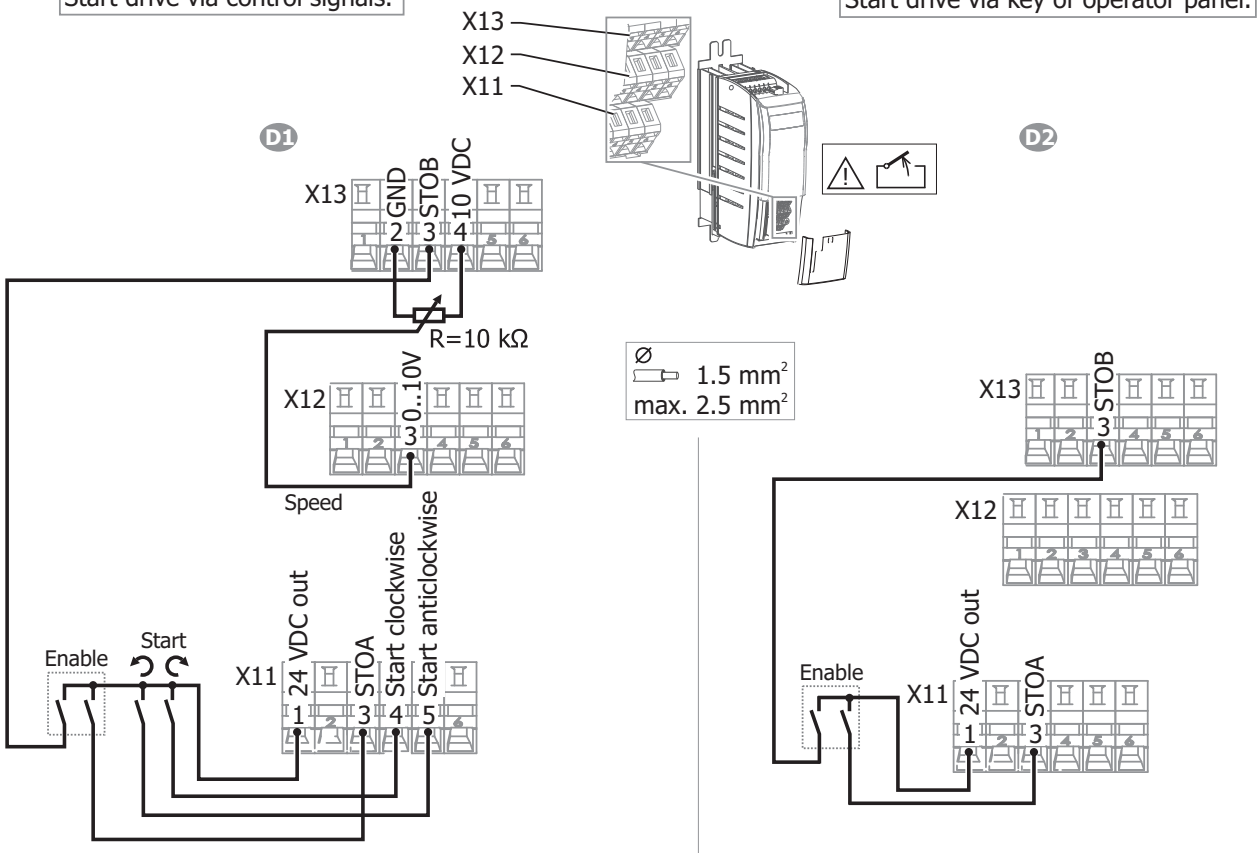
Start drive via control signals.

Operating via operator panel

D2 Connect switch for enable signal

E Setup via operator panel. Refer to section "Setup via operator panel".

Start drive via key of operator panel.



Start drive via control signals

▪After Setup switch on start signals on X11.4 (start clockwise) or X11.5 (start anticlockwise).
The drive is accelerated to 3.50 Hz (default value of P418).

Note: STOA & STOB must be enabled.

Start drive via key of operator panel

▪After Setup select function Motorpoti (menu LocAL/Pot.F, refer to section "Menus and functions").
▪Press RUN.
The drive is accelerated to 3.50 Hz (default value of P418).
▪Press the arrow keys to vary the speed.

Note: STOA & STOB must be enabled.

▪In case of errors refer to section "Error messages and warnings".
▪In case of wrong direction of rotation exchange two motor phases (e.g. U and V).

Note

For the default functions of all control terminals refer to section "Functions of control terminals".

E Setup via operator panel

- Switch on enable signals on X11.3 and X13.3.
- Switch off start signals on X11.4 and X11.5.
- Switch on mains supply.
- Start Setup procedure.

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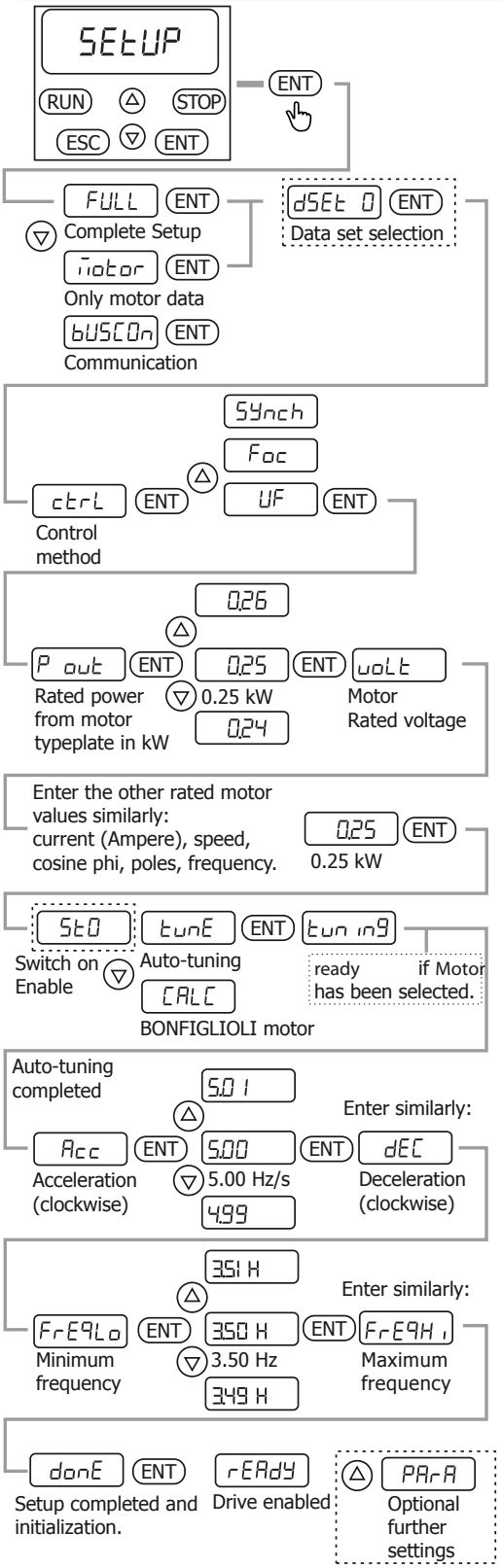
Caution!

- If the motor data is not entered correctly, the drive may be damaged.



Setup can be selected via menu item "Setup".
At first switch-on Setup is displayed automatically.

FULL	Select for the first commissioning.
motor	Select for only motor data measuring.
buSCOn	Select for commissioning of communication.

Data set query is only displayed if Setup is manually selected via the menu item "Setup". Choose data set 0. Another setting is only necessary for setup of various motors.

Control method

UF	Asynchronous motor	V/f-control with variable speed (default).
Foc	Asynchronous motor	Field-oriented control. High drive dynamics and accurate speed control and torque control.
SYnch	Synchronous motor	

Motor typeplate (example)

V Δ/Y	Hz	kW	A Δ/Y	min^{-1}	cos φ
230/400	50	0.25	1.32-0.76	1375	0.77

uoLt FrEQ P out AMPErE SPEEd coSPh,

Press ▲ or ▼ for 1 s to increment or decrement each digit separately.

Entry of coSPh, in control method UF and Foc.
Entry of PoLES (number of pole pairs) in control method SYnch.

tunE	Automatic measurement of further motor data.
CALC	Select if the data of a BONFIGLIOLI motor has been entered. Presetting of further motor data is loaded.

StO	Message only if enable signal is missing. Set enable signals at X11.3 and X13.3.
SA00-- SF00--	In case of error messages refer to section "Error messages and warnings during Setup".

Acc	Acceleration clockwise. Default 5 Hz/s.
dEC	Deceleration clockwise. Default 5 Hz/s.
FrEQLo	Minimum frequency. Default 3.50 Hz.
FrEQH,	Maximum frequency for speed limitation. Default 50.00 Hz.

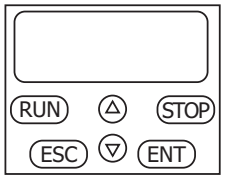
Optional further settings

- Motor temperature evaluation at X12.4 via thermal contact, PTC, KTY, PT1000.
- Stopping behaviour. Free coast-down, stop and switch off, emergeny stop etc. can be set.
- Functions for energy savings.
- PID controller for process control.
- Electronic gear. Synchronisation of drives.

Refer to the operating instructions manual.

- Start drive via control signals or via key of operator panel. Refer to previous page.

Keys



RUN	Start the drive.
STOP	Stop the drive.
ESC	Cancel. Return to the previous menu.
ENT	Reversal of rotation in mode "Motorpoti". Confirm settings.

△	Increase speed in mode "Motorpoti". Scroll up to parameter numbers. Increase parameter values.
▽	Decrease speed in mode "Motorpoti". Scroll down to parameter numbers. Decrease parameter values.

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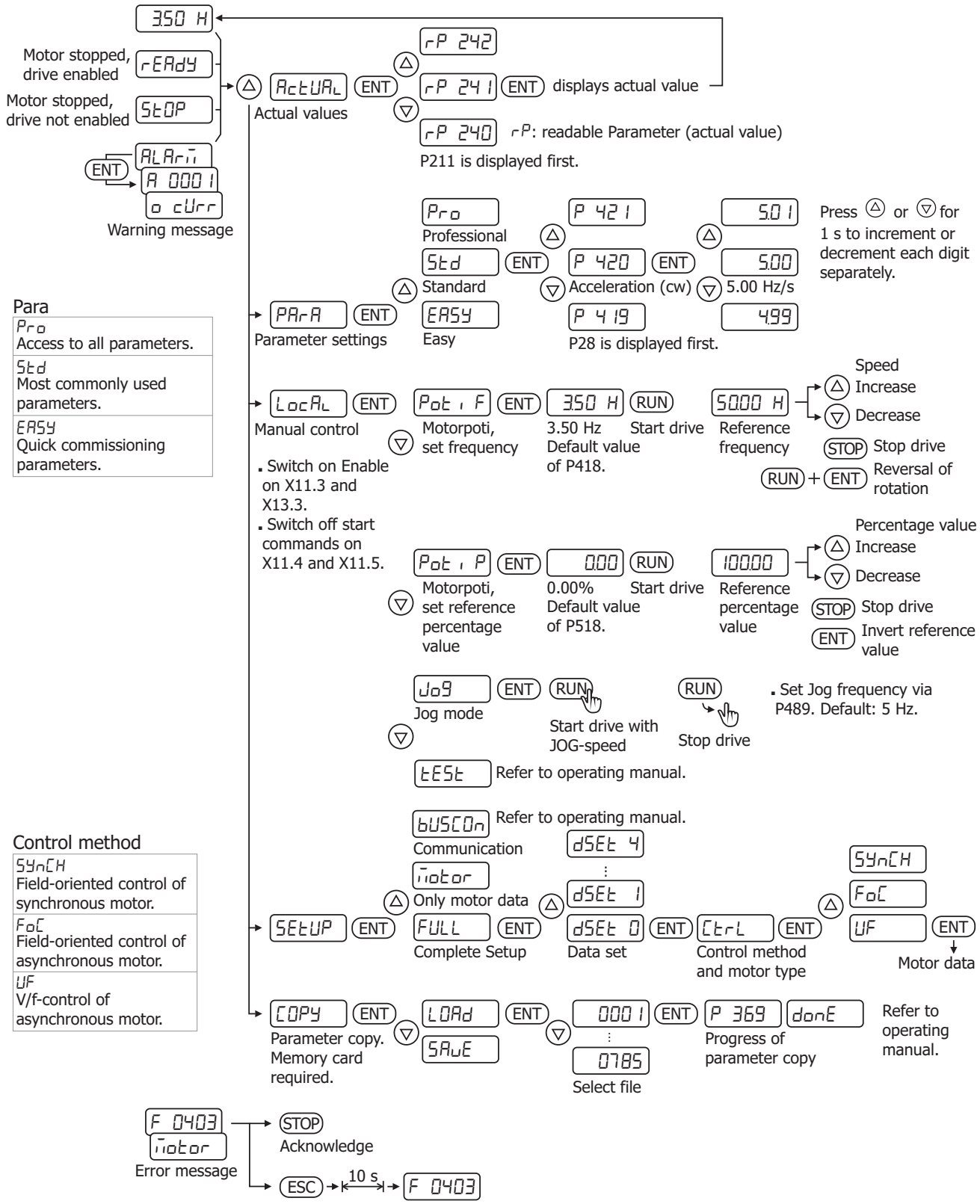
Menus and functions



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Error messages and warnings during Setup

Display	Fault clearance
Error messages	
SF001 ... SF0022	Check rated motor values in parameters 370...376. Correct the values if necessary. Repeat Setup. Check motor cable connections and frequency inverter connections.
Warnings	
SA001 ... SA004	Check rated motor values in parameters 370...376. Correct the values if necessary. Repeat Setup.
SA002 1, SA0022	The following causes are possible: The motor cable cross-section is not sufficient. The motor cable is too long. The motor cable is not connected correctly.
SA004 1, SA0042	Check P372 (rated speed), P375 (rated frequency).
SA005 1	The machine data for star connection is entered, but the motor is connected in delta. For star connection change the motor cable connection. For delta connection check the entered rated motor values. Repeat Setup.
SA0052	The machine data for delta connection is entered, but the motor is connected in star. For delta connection change the motor cable connection. For star connection check the entered rated motor values. Repeat Setup.
SA0053	Check motor connection and frequency inverter connections.

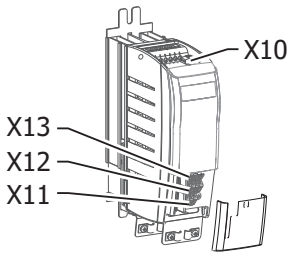
- Press ESC to correct a parameter value after an error message or after a warning message.
- Press ENT to ignore a warning message. Setup is coninued. It is recommended to check the entered data.

Error messages and warnings during operation

Display	Fault clearance
Error messages	
F0 102, F0 103	Frequency inverter overloaded. Check load behavior. Check motor parameter settings.
F0200 ... F0300	Overtemperature. Check cooling, fan, sensor and ambient temperature. Low temperature. Check ambient temperature and electrical cabinet heating.
F0400, F0403	Motor temperature too high or sensor defective. Check connection on X12.4. Phase failure. Check motor and wiring.
F0500 ... F0507	Overloaded, short circuit or earth fault, motor current or phase failure. Check load behavior and ramps (P420...P423). Check motor and wiring.
F0700 ... F0706	DC link voltage too high or too low. Check deceleration ramps (P421, P423) and the connected brake resistor. Check mains voltage. Power failure or phase failure, voltage break-chopper or motor-chopper too high. Check mains voltage, mains fuses and circuit.
F080 1, F0804	Electronics voltage (24 V) too high or too low. Check wiring of control terminals.
F 1100 ... F 1110	Maximum frequency achieved. Check control signals and settings. Check deceleration ramps (P421, P423) and the connected brake resistor.
F 1310	Minimum output current. Check motor and wiring.
F 1401 F 1407 F 1408	Reference value signal on input X12.3 faulty, check signal. Overcurrent on input X12.3, check signal. Overcurrent on input X12.4, check signal.
Warnings	
A000 1 ... A0004	Frequency inverter overloaded. Check load behavior. Check motor parameters and application parameters.
A0008, A00 10	Overtemperature. Check cooling, fan and ambient temperature.
A0080	Max. motor temperature reached, check motor and sensor.
A0 100	Mains phase failure, check mains fuses and supply cable.
A0400	Limit frequency reached; output frequency is limited.
A0800	Input signal at X12.3 is too low. Increase the value.
A 1000	Input signal at X12.4 is too low. Increase the value.
A4000	DC link voltage has reached the type-specific minimum.

- Press ESC to hide an error message. It it displayed again after 10 seconds.
- Press STOP to acknowledge an error message or a warning message. Remove the fault.

Functions of control terminals



- 6 digital inputs, 2 of them for Enable
- 1 digital input/output
- 2 multifunction inputs: digital/analog input
- 1 digital output
- 1 multifunction output: digital/analog/frequency
- 1 voltage input 24 VDC
- 2 voltage outputs, 10 and 24 VDC
- 1 relay output
- Communication interface CAN

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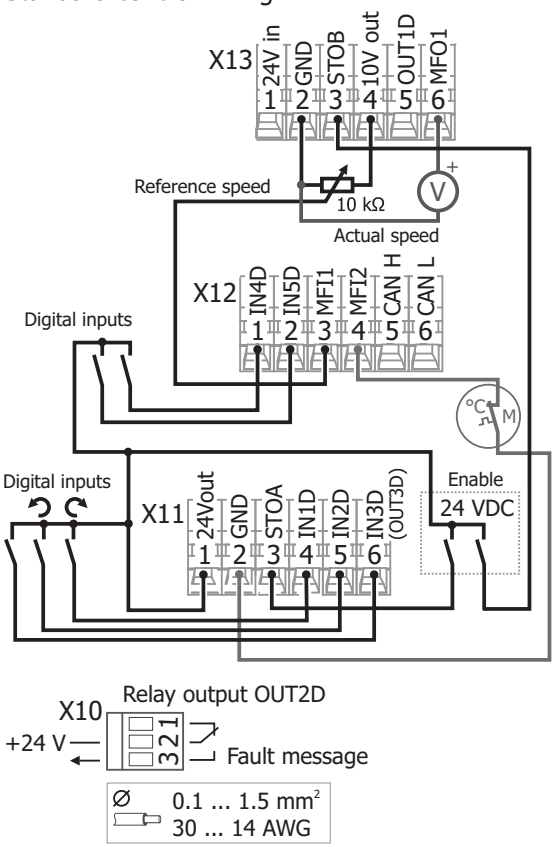
Standard control wiring



T	Default function
X13.1	24 VDC input
X13.2	GND for X13.1
X13.3	Digital input. Input 2 for enable. Contact opened: output disabled, motor coast to a standstill. Contact closed (together with X11.3): normal operation.
X13.4	10 VDC output
X13.5	Digital output. Run signal. Indicates output of frequency when enable and start command applies.
X13.6	Multifunction output. Default: analog. Voltage signal proportional to actual speed. 10 V at 50 Hz, 0 V at 0 Hz.
X12.1	Digital input. Data set change-over together with X11.6.
X12.2	Digital input. Error acknowledgment.
X12.3	Multifunction input: digital/analog. Default: analog voltage input. Reference speed. 50 Hz at 10 VDC, 3.50 Hz at 0 VDC.
X12.4	Multifunction input: digital/analog. Default: digital input. For connection of motor thermal contact. Set P570.
X12.5	CAN High — Systembus connection. Refer to the separate manual.
X12.6	CAN Low
X11.1	24 VDC output
X11.2	GND for X11.1
X11.3	Digital input. Input 1 for enable. Contact opened: output disabled, motor coast to a standstill. Contact closed (together with X13.3): normal operation.
X11.4	Digital input. Start clockwise.
X11.5	Digital input. Start anticlockwise.
X11.6	Digital input/output. Default: input. Data set change-over together with X12.1.

▪ Comply with the technical data. Refer to section "Technical data of control terminals".

IN□D: digital input
MFI1: multifunction input
MFI2: multifunction input
OUT□D: digital output
MFO1: multifunction output
P: Parameter
T: Terminal
X: Terminal strip

Thermal contact evaluation

X12.4	P570	
		0-off (default) 1-Warning 2-Error switch-off

Data set change-over

X11.6	X12.1	Selection
0	0	Data set 1
1	0	Data set 2
1	1	Data set 3
0	1	Data set 4

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Extended settings of control terminals

Multifunction input

X12.3	P452	1-voltage 0...10V
X12.4	P562	2-current 0...20mA
		3-digital NPN
		4-digital PNP
		5-current 4...20mA
		6-voltage, characteristic
		7-current, characteristic

6-: programmable characteristic via P454...457
7-: programmable characteristic via P564...567
(Refer to operating instructions manual.)

Digital input/output

X11.6	P558	0-input (default)
		1-output

Multifunction output

X13.6	P550	1-digital 2-analog (default) 3-repetition frequency 4-pulse train	P554 P553 P555 P557	Select signal. Scaling.

Default:
1-: Signal when output frequency exceeds 3 Hz (P510).
2-: Output of voltage proportional to speed.
3-: Frequency output. 0...24 V propotional to speed.
4-: Output of pulse train, scaled by P557.

Switchable logic of digital inputs

X11.4 X11.5 X11.6 X12.1 X12.2	P559	0-NPN 1-PNP

X12.3	P452	3-digital input NPN 4-digital input PNP
X12.4	P562	3-digital input NPN 4-digital input PNP

NPN: LOW-switching (on negative signal). Default of P562.
PNP: HIGH-switching (on positive signal). Default of P559.

Applications via control terminals

Voltage input and outputs

	T	Function
Voltage input GND	X13.1 X13.2	24 VDC GND for terminal X13.1
Voltage output GND	X11.1 X11.2	24 VDC GND for terminal X11.1
Voltage output	X13.4	10 VDC

Output signals

	T	Function
Actual frequency	X13.6	Voltage signal proportional to frequency (speed). At 50 Hz (P419) output of 10 VDC. At 0 Hz output of 0 VDC.
Operational state	X13.5	Run signal. Indicates enable and start command. Output frequency available.

Input signals

Application	T	Default function and settings
Start Change direction of rotation	X11.3 X13.3 X11.4 X11.5	Enable: digital signals at both terminals. AND Start clockwise (cw) via rising signal edge or Start anticlockwise (ccw) via rising signal edge.
Stop	X11.3 X13.3 X11.4 X11.5	Disable: Reset digital signal on at least one terminal. OR Reset Start clockwise or Reset Start anticlockwise.
Set motor speed	X12.3	Reference speed 0 ... 10 VDC at analog input. P452=1-voltage (default). 0 V corresponds to 3.50 Hz (default value of P418). 10 V corresponds to 50 Hz (default value of P419).
Select output frequency	X X	Fixed frequency change-over via two digital inputs. Set P492=3. Set frequency values in P480 ... 483. Select digital inputs for P66 and P67. Select a frequency value via P66 and P67.
Data set change-over	X11.6 X12.1	Data set change-over via two digital inputs. The four data sets can include different parameter values. Select a data set via X11.6 and X12.1.

X11.3	X13.3	X11.4	X11.5	
1	1	0	0	Enable
1	1	1	0	Start cw
1	1	0	1	Start ccw
1	1	1	1	Stop

Digital inputs

71	X11.4
72	X11.5
73	X11.6 (P558=0)
74	X12.1
75	X12.2
76	X12.3 (P452=3 NPN or 4 PNP)
77	X12.4 (P562=3 NPN or 4 PNP)

P66	P67	Selection	Default
0	0	P480	0 Hz
1	0	P481	10 Hz
1	1	P482	25 Hz
0	1	P483	50 Hz

X11.6	X12.1	Selection
0	0	Data set 1
1	0	Data set 2
1	1	Data set 3
0	1	Data set 4

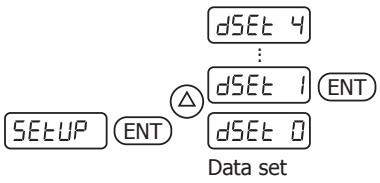
Protection function

Application	T	Function and settings
Motor temperature	X12.4	Connect a motor thermal contact. Set P570: 1 Warning or 2 Error switch-off.

Voltage input for external voltage supply
The external voltage supply enables the function of inputs, outputs and communication, even if the power supply of the frequency inverter is switched off. Refer to section "Technical data of control terminals".

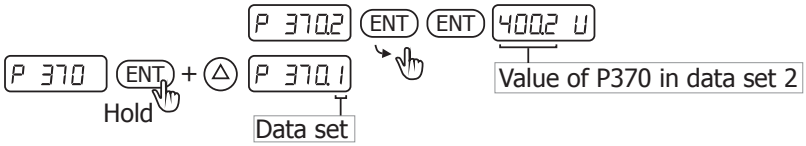
Data set

Parameter values can be stored in four different data sets.
If a data set is selected, the entered data is only stored in the selected data set. The other data sets contain standard values. If no data set is selected the entered data is stored in all four data sets.
The data sets can be switched-over via control terminals (refer to section "Functions of control terminals"). This enables the setting of different operating points of the drive or settings for different motors.
Example 1: Carry out auto-tuning and enter motor data in data set 1.



When setup is carried out the entered and measured motor data is stored in the selected data set.

Example 2: Set the motor rated voltage P370 in data set 2.

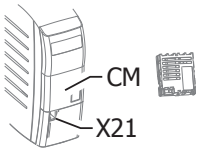


Display actual values

	Parameter	Display	
R.m.s Current [A]	P211	3.0 A	R.m.s. output current of the frequency inverter (motor current).
Output Voltage [V]	P212	400 U	Output voltage of the frequency inverter.
Active Power [kW]	P213	1.1	Power of the motor at the current operating point.
Actual Speed [min^{-1}]	P240	1375	Motor speed.
Actual Frequency [Hz]	P241	50 Hz	Output frequency of the inverter (actual frequency of the motor).
Current Error	P259	F0 102	The cause of error switch-off.
Warnings	P269	A0001	Warning because of a critical condition.
Last Error	P310	F0 102	The last error.

Optional communication modules

RS485, Modbus or VABus: CM-485
RS232, Modbus or VABus: CM-232
Profibus-DP: CM-PDPV1
CANopen or System bus: CM-CAN



Communication interface X21 with RJ45 connection

For serial RS485 communication via VABus or Modbus protocol.
BONFIGLIOLI Vectron provides an interface adaptor for the USB connection of a PC. This enables parametrization and monitoring via the PC software VPlus.

Parameter copy

Parameter values can be stored on a memory card ("Resource Pack") and transferred from one inverter to another inverter.

Reset to factory setting

Select P34 in menu item PArA. Set P34 to 4444. This resets the parameter settings to the default values.

Key lock

Select P27 in menu item PArA and set a password. Then parameter values in menu item PArA and the motorpoti function are password-protected. Ten minutes after a correct password entry the password inquiry is displayed again.

Further information

Detailled operating instructions can be downloaded from the website of BONFIGLIOLI.

Technical data

GB

AgilE 1		400 V 3~						
Type		402-02	402-03	402-05	402-07	402-09	402-11	402-13
Size		1						
Output, motor side								
Recommended motor shaft power	kW	0.25	0.37	0.55	0.75	1.1	1.5	2.2
Output current	A	0.8	1.2	1.5	2.1	3.0	4.0	5.5
Long-term overload current (60 s)	A	1.2	1.8	2.25	3.15	4.5	6.0	8.2
Short-term overload current (1 s)	A	1.6	2.4	3.0	4.2	6.0	8.0	11.0
Output voltage	V	3-phase. Input voltage as max. output value.						
Protection		Short-circuit proof/earth fault proof						
Rotating field frequency	Hz	0 ... 1000, depending on switching frequency						
Switching frequency	kHz	2, 4, 8, 16						
Brake-chopper integrated		Yes						
Output, brake resistor								
Min. brake resistance	Ω	300	300	300	300	300	220	220
Recommended brake resistor (770 V)	Ω	2432	1594	930	634	462	300	220
Input, mains side								
Mains configuration		TT, TN, IT						
Rated current	A	0.8	1.2	1.8	2.4	2.8	3.3	5.8
Maximum mains current (EN 61800-5-1)	A	1.1	1.5	2.0	2.7	3.9	5.2	7.3
Mains voltage range	V	380 (-15%) ... 480 (+10%)						
Mains frequency	Hz	45 ... 69						
Fuses [UL 600 VAC RK5]	A	6 [6]	6 [6]	6 [6]	6 [6]	6 [6]	6 [6]	10 [10]
Overvoltage category		EN 50178 III, DIN EN 61800-5-1 III						
Influencing factors								
Energy dissipation (at 2 kHz switching frequency)	W	19	29	42	53	70	89	122
Coolant temperature (air)	°C	0 ... 40 (40 ... 55 with derating)						

Communication	
Connection X21	Serial data interface RS485. Communication via VABus or Modbus protocol.
CAN system bus	Control terminals, CAN interface ISO-DIS 11898.
Optional module	RS232, RS485, Profibus-DP or CANopen.
Storage	
Digital memory card	Save and transfer parameter values via standard memory card.

Technical data

AgilE 2, AgilE 3		400 V 3~					
Type		402-15	402-18	402-19	402-21	402-22	402-23
Size		2		3			
Output, motor side							
Recommended motor shaft power	kW	3.0	4.0	5.5	7.5	9.2	11.0
Output current	A	7.5	9.5	13.0	17.0	20.0	23.0
Long-term overload current (60 s)	A	11.2	14.2	19.5	25.5	30.0	34.5
Short-term overload current (1 s)	A	15.0	19.0	26.0	34.0	38.0	46.0
Output voltage	V	3-phase. Input voltage as max. output value.					
Protection		Short-circuit proof/earth fault proof					
Rotating field frequency	Hz	0 ... 1000, depending on switching frequency					
Switching frequency	kHz	2, 4, 8, 16					
Brake chopper integrated		Yes					
Output, brake resistor							
Min. brake resistance	Ω	106	106	48	48	48	48
Recommended brake resistor (770 V)	Ω	148	106	80	58	48	48
Input, mains side							
Mains configuration		TT, TN, IT					
Rated current	A	6.8	7.8	14.2	15.8	20.0	26.0
Maximum mains current (EN 61800-5-1)	A	9.8	12.8	17.2	23.0	28.1	33.6
Mains voltage range	V	380 (-15%) ... 480 (+10%)					
Mains frequency	Hz	45 ... 69					
Fuses [UL type 600 VAC RK5]	A	10 [10]	10 [10]	25 [20]	25 [20]	35 [30]	35 [40]
Overvoltage category		EN 50178 III, DIN EN 61800-5-1 III					
Influencing factors							
Energy dissipation (at 2 kHz switching frequency)	W	133	167	235	321	393	470
Coolant temperature (air)	°C	0 ... 40 (40 ... 55 with derating)					

Communication	
Connection X21	Serial data interface. RS485 communication via VABus or Modbus protocol.
CAN system bus	Control terminals, CAN interface ISO-DIS 11898.
Optional module	RS232, RS485, Profibus-DP or CANopen.
Storage	
Digital memory card	Save and transfer parameter values via standard memory card.

GB

Technical data of control terminals

Voltage outputs

X11.1	24 VDC, I_{max}=100 mA. Appropriate GND: X11.2.
X13.4	10 VDC, I_{min}=2.3 mA (dependent on level of 24 VDC voltage input), I_{max}=8.2 mA

Voltage input

X13.1 Input for external voltage supply. Connect the ground potential of the external voltage supply to X13.2 (GND).

Input voltage range	24 VDC ±10%
Rated input current	Max. 1.0 A (typical 0.45 A)
Peak inrush current	Typical < 15 A (max. 100 µs)
External fuse	Via standard fuse element for rated current, characteristic: slow
Safety	Safety extra low voltage (SELV) according to EN 61800-5-1

Digital enable inputs

X11.3 / X13.3

Signal levels	Low 0 ... 3 VDC, High 12 ... 30 VDC
U_{max}	30 VDC (10 mA at 24 VDC)
Input resistance	1.8 kΩ
Response time	STO is activated 10 ms after triggering.

Digital inputs

X11.4 / X11.5 / X12.1 / X12.2

Signal levels	PNP input	High ≥ 10 VDC
	NPN input	High ≤ 5 VDC
U_{max}	30 VDC (6 mA at 24 VDC)	
Input resistance	3.9 kΩ	
Response time	2 ms	
PLC-compatible		

Switch-over PNP/NPN

X11.4	P559	X12.3	P452
X11.5		X12.4	P562
X12.1			
X12.2			
X11.6			

X11.6 → Digital input/output
X12.3 → Multifunction
X12.4 → Multifunction

Digital outputs

X13.5

U_{out}	22 VDC (15 ... 30 VDC)
I_{max}	100 mA (I_{max} is reduced if further control outputs are used.)

Overload- and short-circuit-proof, overvoltage-protected.
X11.6 → Digital input/output

Analog input

X12.3 → Multifunction
X12.4 → Multifunction

Digital input/ output

X11.6 Default: digital input. → Refer to table row "Digital inputs".
Can be configured as digital output by means of P558.
Output:

U_{out}	22 VDC (15 ... 30 VDC)
I_{max}	100 mA (I_{max} is reduced if further control outputs are used.)

Overload- and short-circuit-proof, overvoltage-protected.

Multifunction

Digital/ analog input — X12.3

Default: analog voltage input. Can be configured as analog current input or digital input by means of P452.

Voltage input	0 ... 10 VDC (R_i=78 kΩ)	Resolution 10 Bit	R_i: input resistance
Current input	0 ... 20 mA (R_i=250 Ω)	Resolution 9 Bit	
Digital input	→ Refer to table row "Digital inputs".		

Digital/ analog input — X12.4

Default: digital. Can be configured as analog input MFI2A by means of P562.

Voltage input	0 ... 10 VDC (R_i=78 kΩ)	Resolution 10 Bit	R_i: input resistance
Current input	0 ... 20 mA (R_i=250 Ω)	Resolution 9 Bit	
Digital input	→ Refer to table row "Digital inputs".		

Digital/ analog/ frequency/ pulse train output — X13.6

Default: analog. Can be configured as digital output, analog output, frequency output or pulse train output by means of P550.
Analog signal: pulse width modulated, f_{pwm}=116 Hz. Frequency signal: f_{max}=150 kHz.
Digital output:

U_{out}	22 VDC (15 ... 30 VDC)
I_{max}	100 mA (I_{max} is reduced if further control outputs are used.)

Overload- and short-circuit-proof, overvoltage-protected.

Relay output — X10

Floating change-over contact. Response time approx. 40 ms, suitable for brake control.
Maximum contact load: make contact: AC 5A/240V, DC 5A (ohmic)/24V, break contact: AC 3A/240V, DC 1A (ohmic)/24V

Caution!

- The digital inputs and the 24 VDC input can withstand external voltage up to 30 VDC. Avoid higher voltage levels.
- The temperature monitoring must be sufficient insulated towards the motor winding.

Bonfiglioli

power, control and green solutions

Bonfiglioli has been designing and developing innovative and reliable power transmission and control solutions for industry, mobile machinery and renewable energy applications since 1956.

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